NIST/SGIP Status Update

IEEE PES 2011 Summer Power Meeting

By

Jerry Melcher, Executive Advisor

jmelcher@quanta-technoloy.com

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QUANTA TECHNOLOGY

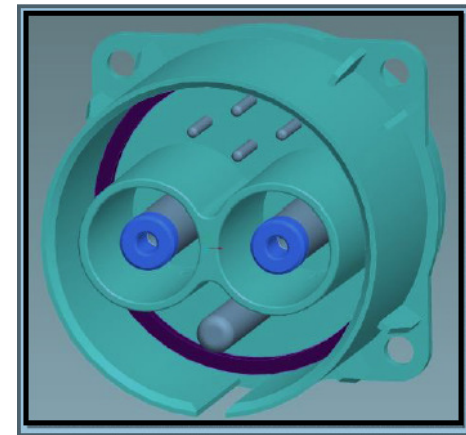the power of 1

NIST/SGIP Status Update

Agenda

- **The Role of Standards in the Electric Utility Industry**

- **Smart Grid Interoperability Program**

- **SGIP Activities–Impact on Customer Domain**

- **Tasks Ahead**

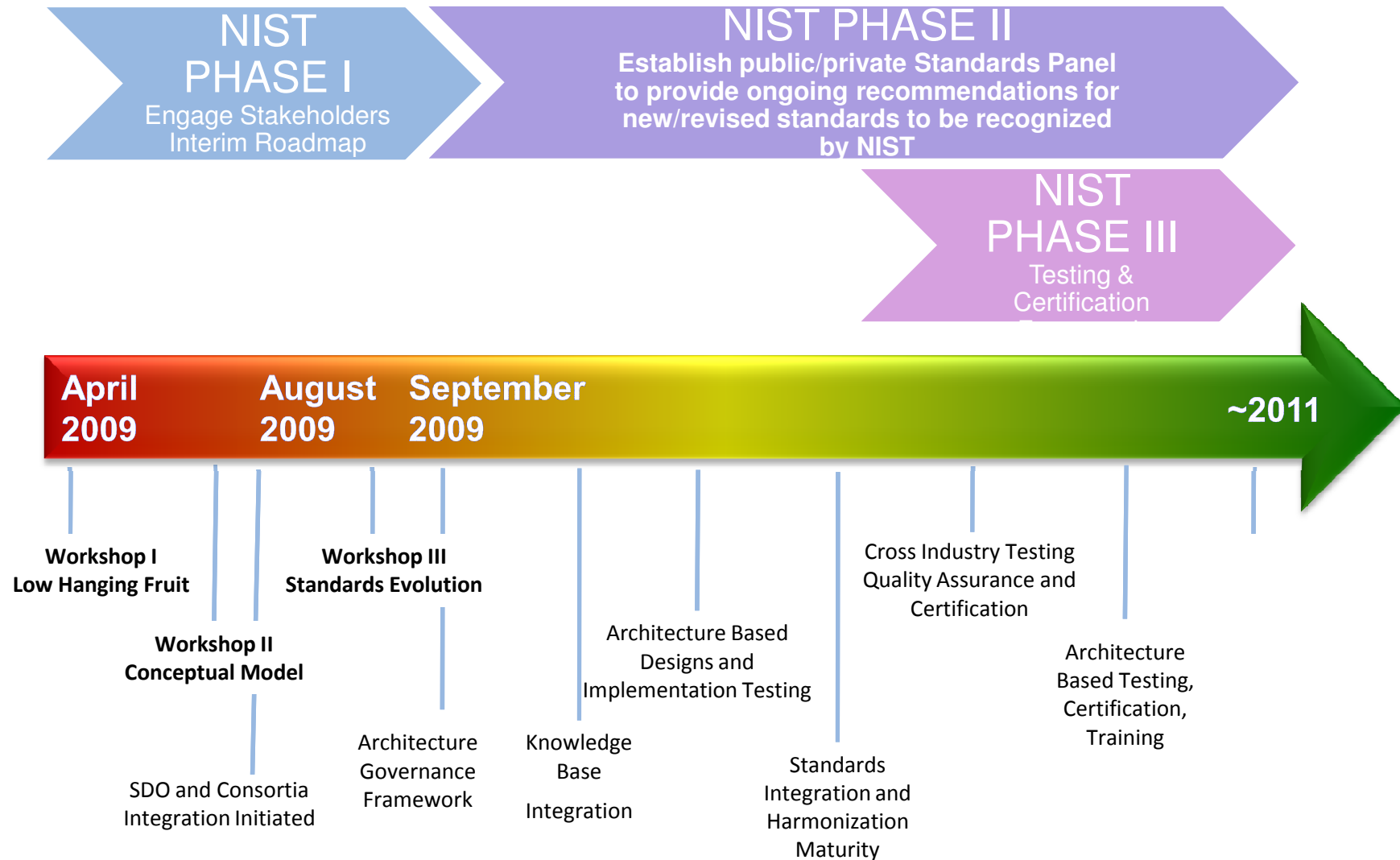# The Role of Standards in the Electric Utility Industry

- Business Drivers

- U.S. Government Mandates

- Utility Domains

- Customer Domains

Standards Business Drivers

- **Enable Customer Participation**

- **Improve Economics**

- **Assure Reliability**

- **Provide Business Continuity**

- **Support Government Mandates**
  - *Implement Security / NERC CIP*

NIST Interoperability Standards Timeline

NIST PHASE I
Engage Stakeholders
Interim Roadmap

NIST PHASE II
Establish public/private Standards Panel to provide ongoing recommendations for new/revised standards to be recognized by NIST

NIST PHASE III
Testing & Certification

April 2009 **August 2009** **September 2009** **~2011**

Workshop I
Low Hanging Fruit

Workshop II
Conceptual Model

SDO and Consortia
Integration Initiated

Workshop III
Standards Evolution

Architecture
Governance
Framework

Knowledge
Base
Integration

Architecture Based
Designs and
Implementation Testing

Standards
Integration and
Harmonization
Maturity

Cross Industry Testing
Quality Assurance and
Certification

Architecture
Based Testing,
Certification,
Training

Government Mandates

- **Northeast Blackout – August 2003**

- **Energy Policy Act 2005**

- **CPUC AMI Rulemaking 2005**

- **Energy Information and Security Act 2007**

  - ➢ **Authorizes NIST to lead Smart Grid standards effort**

- **ARRA 2009**

  - ➢ **Appropriates funds to NIST via DOE for SGIP**

- **NERC Standards / FERC Rulemaking**

NIST / SGIP Actions

- **Smart Grid Framework 1.0 released Feb 2009**

- **Smart Grid Interoperability Program created Aug 2009**

- **650 companies participating**

- **30 members on Governing Board**

- **FERC Smart Grid Standards hearing Jan 2011**
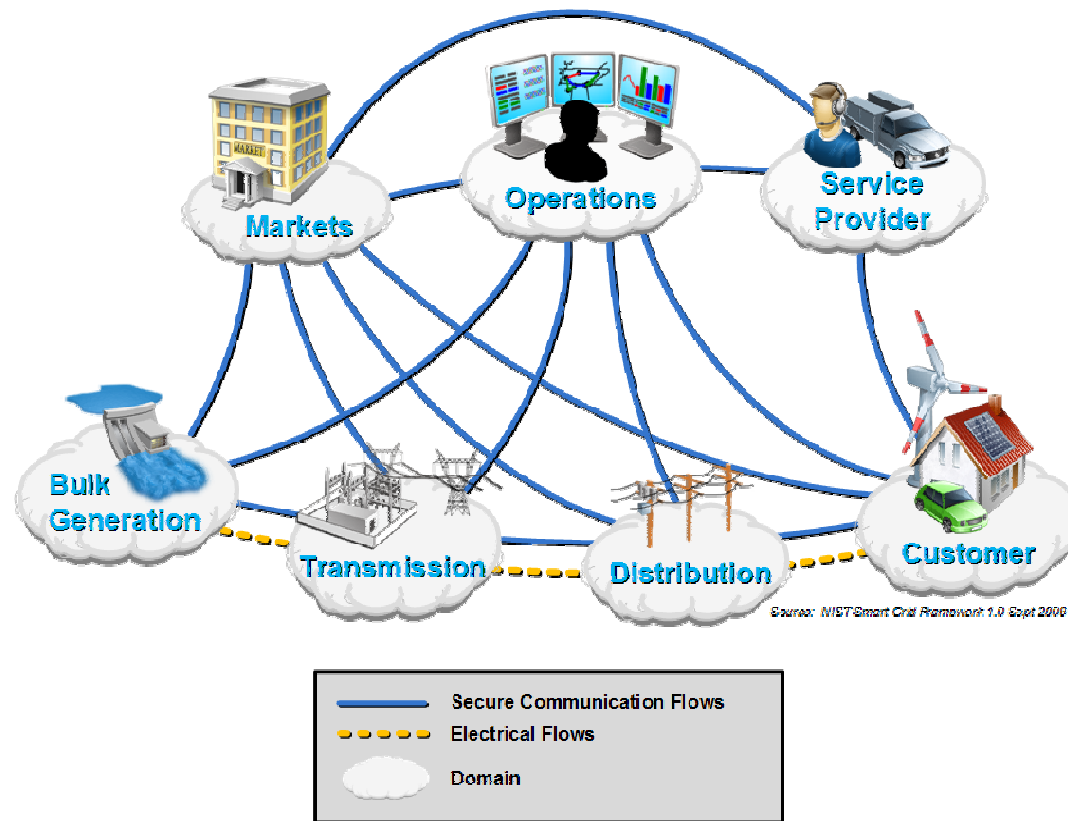
NIST Interoperability Standards - PEV

- **Final Interim Smart Grid Framework 1.0, 2009**
  - *Section 4.5 - Electric Transportation*
  - *Section 6.5 – Requirements, Standards Gaps, Discussion Issues*
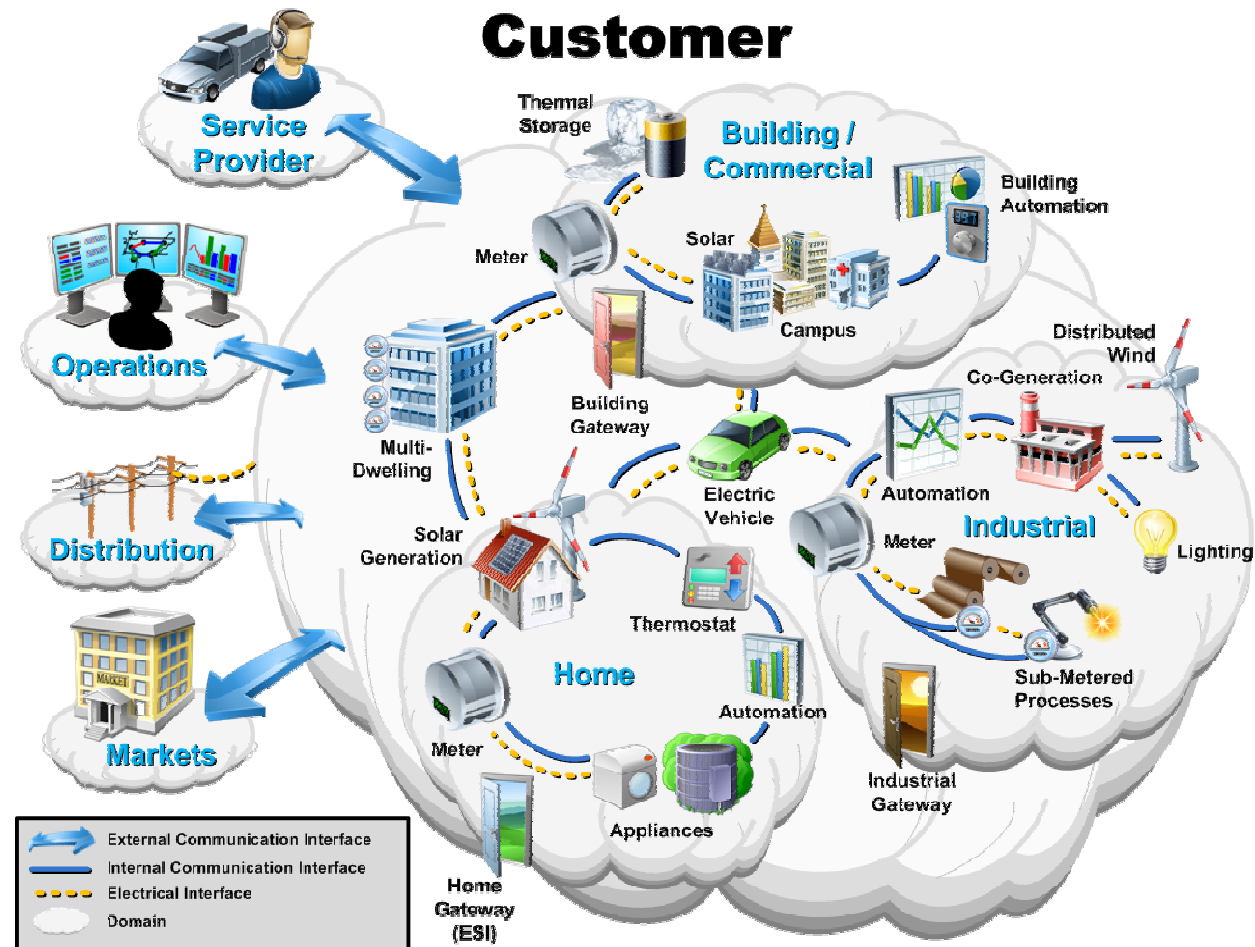   - *Subsection 1.1.3.1 - Discussion Issues Related to Electric Transportation*

ENVI > Chrysler 200C EV Concept

Utility Domains

Conceptual Model

Markets · Operations · Service Provider · Bulk Generation · Transmission · Distribution · Customer

Source: NIST Smart Grid Framework 1.0 Sept 2009

Legend:
- Secure Communication Flows
- Electrical Flows
- Domain

Customer Domain

Identifying Customer Standards Needs

- **Smart Meters**

- **Home Area Network**

- **Customer Devices including PEVs**

- **Information Models**

- **Communication**

- **Security**

Saturn VUE PHEV

NIST Interoperability Standards - PEV

Domain	Discussion Issues	Standards Potentially involved	Who
Operations Customer	**What standards and models are needed for DMS to send appropriate signals to PEVs and other DR devices?** Distribution management systems must be able to influence charging profiles and discharging incentives (through price signals or direct control signals to energy service interfaces) to help manage the distribution system, especially during reconfiguration, unusual loading conditions, etc.	IEC 61850, ANSI C12.19, BACnet, OpenADR, ANSI C12.22, DLMS/COSEM, Smart Energy Profile, SAE J2836 etc.	IEC TC57 WG17, Zigbee/HomePlug Alliance, ANSI, BACnet, SAE IEC TC13
Customer Operations	**Which standard should be used for object models of PEV?** A decision needs to be made on which object modeling standards should be used to model PEVs, and in which domains. Then they could be tasked to develop those models. In all cases, need harmonization across domains for PEVs	IEC 61850, IEC 61968, Smart Energy Profile, OpenADR, ANSI C12.19	SAE, IEC TC57 WG17, IEC TC57 WG14, OpenADR, ANSI, NEMA
Market	**If regulations change, there is a need to develop new Use Cases** and the standards that would be derived from them if reselling stored retail power were permitted by regulators	SAE J 2836 ™	SAE, SEP, OpenADR, ANSI, IEC TC57
Distribution	**PEV accounting need to be discussed.** Need to determine how PEV settlements could be handled, and what standards might be necessary	SAE J 2847	SAE, SEP, OpenADR, ANSI
Customer	**Discussion on PEV charging/discharging.** May need some type of weights and standards seal for charging/discharging *(issue needs clarification)*	SAE J 1772 ™	SAE
Distribution	**Discussion on submetering for PEV.** May need submetering standard for non-utilities, so need policies, regulations, and testing as well as understanding whether existing standards for metering and retrieving metered data are adequate		SAE, ANSI, OpenADR, Service Providers
Customer	**Role of government and emergency responders with PEV:** There is a missing actor, or even domain – the government agencies (state or federal); as they'll be playing active role with respect to vehicles; emergency, disaster response; charge rates, giving first-responders with priority. Elevating ability to charge vehicles. Government access in bidirectional way – getting information from, or sending information down through the system		SAE, FEMA, Emergency First Responders

PAPs that Address Customer Domain NIST / SGIP Actions

- **PAP 1 - Role of IP in the Smart Grid Home Area Network**

- **PAP 2 - Wireless Communications for the Smart Grid Information Models**

- **PAP 3 - Common Price Communication Model - OASIS eMIX**

- **PAP 4 - Common Scheduling Mechanism - IETF iCal**

- **PAP 5 - Standard Meter Data Profiles – ANSI C12.19**

- **PAP 7 - Electric Storage Interconnection Guidelines – IEC 16850**

- **PAP 9 - Standard DR and DER Signals – OASIS Auto DR**

- **PAP 10 - Standard Energy Usage Information - NAESB**

- **PAP 11 - Common Object Models for Electric Transportation - SAE**

- **PAP 15 - Harmonize Power Line Carrier Standards for Appliance Communications in the Home – ITU and IEEE**

- **PAP 18 - SE 1.x to SE 2.0 Transition and Coexistence**

PEV Industry Activities

- EPRI Infrastructure Working Group
  - Electric Transportation
  - PHEV Working Group
- SAE Hybrid Working Group
- IEC TC69

Tasks Ahead

- **Field and Home Connectivity Standards**
  - ➢ **AMI / ZigBee / Broadband / Wi-Fi / Homeplug PLC**

- **Full Network Information Model Standard**
  - ➢ **CIM for PEVs, IEC 60968 and Smart Energy 2.0**

- **Distributed Energy Resource Interfaces**
  - ➢ **Vehicle as Source, IEC 61850**

- **Standards Test Conformance and Certification**
  - ➢ **Incremental Open Interoperability Demonstrations**

- **Implementation of Emerging Regulations**
  - ➢ **CPUC Phase 1, 2 Rulemaking**

Questions?

Jerry Melcher

Quanta Technology

jmelcher@quanta-technology.com

858-353-5470 (Cell)